ABSTRACT OF THE DISCLOSURE

In the present invention, a charge transfer unit is arranged on a first-plane side of a thinly-formed semiconductor base. Charge accumulating units are arranged on a second-plane side, the opposite side. A depletion prevention layer is arranged closer to the second-plane side than the charge accumulating units. The depletion prevention layer prevents a depletion region around the charge accumulating units from reaching the second plane of the semiconductor base. The depletion prevention layer can suppress surface dark current going into the charge accumulating units. Meanwhile, an energy ray incident from the second-plane side pass through the depletion prevention layer to generate signal charges in the charge accumulating units (depletion regions). The charge accumulating units collect, on a pixel-by-pixel basis, the signal charges which are to be transported to the charge transfer unit under voltage control or the like, and then are read to exterior as image signals.